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The effect of gluten on the host-microbial metabolism assessed by urinary metabolomics

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A gluten-free diet clearly improves the life of patients with celiac disease, but the scientific evidence supporting possible health benefits of a gluten-free diet for non-celiac adults is limited. Therefore, as urine reflects the host and gut microbial metabolism, the study aimed to assess the long-term metabolic effect of gluten on the urine metabolome of non-celiac individuals by a cross-over intervention study (gluten-poor and gluten rich, respectively) using a non-targeted metabolomics approach. Fifty-one non-celiac adult participants (30 female, 21 male) were randomized to either a gluten-rich (21.6 ± 5.7 g/day) or a gluten-poor (~ 1 g/day) diet for 8 weeks, crossing over to the other diet after 6 weeks washout. Urine samples were standardised collected at the beginning and end of each diet intervention period and were analysed by gas chromatography mass spectrometry (GC-MS) and liquid chromatography mass spectrometry (LC-MS). Several urinary microbial metabolites were found to be significantly affected by the gluten intake, suggesting that dietary gluten affects the composition and activity of the gut microbiota, which ultimately affects the circulating metabolites. Identification of the affected metabolites as well as integration of the metabolomics data with gut microbiota metagenomics data is ongoing hereby understanding how the metabolite changes are related to the gut microbiota.